

A Novel Surface Thermometry Approach for use in Aerothermodynamic Wind Tunnel Testing, Phase I

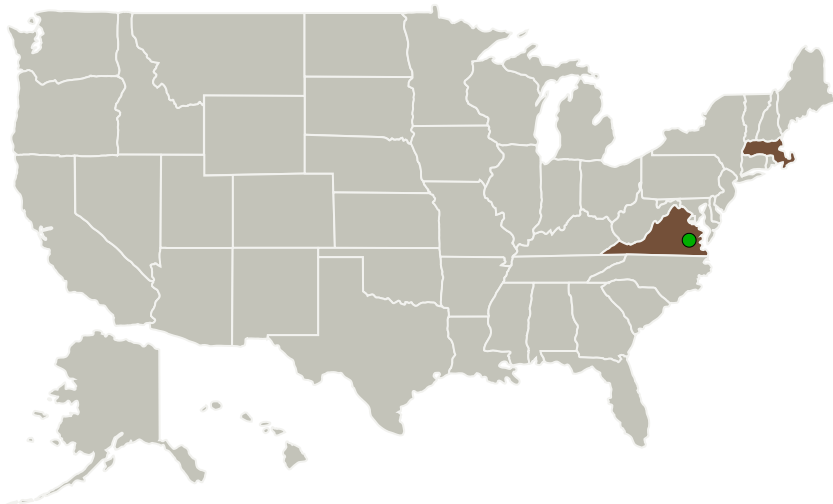
Completed Technology Project (2011 - 2011)



Project Introduction

This SBIR project is aimed at developing a novel thermometry technology with upconverting phosphors for temperature measurement in NASA's high-enthalpy wind tunnels. Conventional thermographic phosphors require illumination by ultraviolet (UV) light and emit light at visible wavelengths. However, UV excitation is problematic in many large-scale facilities because it demands very expensive UV-quality windows and the UV light can be absorbed and scattered by gas species and particles in the flow path. Upconversion phosphors have been previously developed in our company and the temperature-sensing effect up to around 1000°C with excellent sensitivity was demonstrated. A major part of this Phase I efforts will be directed towards applying these thermographic phosphors to a surface coating on a model and tested in a wind tunnel environment. The objective is to develop new surface coatings that are aerodynamically smooth, very durable, require near IR excitation and enable surface temperatures in the range of 300 K to 1500 K to be measured.

Primary U.S. Work Locations and Key Partners



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Organizations Performing Work	Role	Type	Location
Boston Applied Technologies, Inc.	Lead Organization	Industry Minority-Owned Business	Woburn, Massachusetts
● Langley Research Center(LaRC)	Supporting Organization	NASA Center	Hampton, Virginia

Primary U.S. Work Locations

Massachusetts	Virginia
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Project Transitions

 **February 2011:** Project Start

 **September 2011:** Closed out

Closeout Documentation:

- Final Summary Chart(<https://techport.nasa.gov/file/137839>)

Organizational Responsibility

Responsible Mission Directorate:

Space Technology Mission Directorate (STMD)

Lead Organization:

Boston Applied Technologies, Inc.

Responsible Program:

Small Business Innovation Research/Small Business Tech Transfer

Project Management

Program Director:

Jason L Kessler

Program Manager:

Carlos Torrez

Principal Investigator:

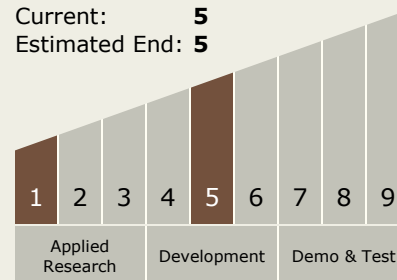
Xiaomei Guo

Technology Maturity (TRL)

Start: **1**

Current: **5**

Estimated End: **5**



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Technology Areas

Primary:

- TX15 Flight Vehicle Systems
 - └ TX15.1 Aerosciences
 - └ TX15.1.8 Ground and Flight Test Technologies

Target Destinations

The Sun, Earth, The Moon,
Mars, Others Inside the Solar
System, Outside the Solar
System